**Micro Case 14: RSV bronchitis**

1. **CASE** **INFO**
   1. 5 month old girl brought into hospital in February with a 2 day h/o cough, respiratory difficulty with nasal discharge and *low grade fever*.
   2. She had begun attending a day care 4 weeks before
   3. All immunizations up to date and no one else at home was ill
2. **SIGNS AND SYMPTOMS OF THE DISEASE**
   1. Physical Exam
      1. **Cough**
      2. Respiratory difficulty
         1. \*\***inspiratory wheezes, hyperinflation of chest**
         2. atelectasis—partial or complete collapse of the lung
      3. rhinorrea
      4. Low-grade fever
      5. Bilateral crackles were noted
      6. VS: 38.1 C; P 135/min; R 60/min; BP 92/60 mmHg
   2. Chest X-ray
      1. Hyperinflation and peribronchiolar infiltrates

1. **SOURCE OF INFECTIOUS ORGANISM**
   1. Respiratory syncytial virus (**RSV**)—bronchiolitis
2. **MANNER OF EXPOSURE**
   1. Community **outbreaks**, **day cares**, **nosocomial outbreaks** (outbreaks in hospitals)
3. **ROUTE OF INFECTION**
   1. Down the **respiratory tract** into the bronchioles (LRI)
4. **TISSUES THAT THEY RESIDE**
   1. **Mucous membranes of the eyes, mouth , or nose** and travels to the **bronchioles** to (usually) cause a lower respiratory infection (LRI)
5. **TRANSMISSION TO OTHERS**
   1. **Direct contact**
   2. The virus is unstable in the environment (only survives a few hours on environmental surfaces) and easily **inactivated with soap and water disinfectants**

1. **PATHOLOGY**
   1. Incubation period= **2-8 days**
   2. RSV **replicates in the nasopharyngeal epithelium** with **spread to bronchioles** 1-3 days later
   3. The disease may involve an immunopathogenic mechanism, with immune complexes, IgE antibody, and histamine playing a role in pathogenesis.
   4. Integral to immune response and **pathogenesis are the F and G glycoproteins**.
   5. Bronchiolitis is a result of **inflammation of the terminal bronchioles, necrosis, and sloughing of the epithelial cells lining the bronchioles**.
   6. The bronchioles of a young child have a small bore🡪when the lining cells are swollen by inflammation, the passage of air to and from the alveoli can be severely restricted, leading to **wheezing and hyperinflation**.
   7. Immunity to the initial infection is brief, and **reinfections are common (**although less severe), despite the presence of RSV-specific local and systemic antibodies and neutralizing antibody.
2. **METHODS OF IDENTIFICATION AND PLACEMENT INTO A PARTICULAR BIOLOGICAL SUBSET**
   1. **Paramyxoviridae** family virus
      1. Includes the genus pneumovirus
      2. **Enveloped** virus with **negative sense ssRNA (nonsegmented**)
      3. **Helical** nucleocapsid surrounded by a lipid envelope
         1. Envelope has **fusion protein (F)** and large GP’s and a second **glycoprotein (G)**
            1. Two antigenic types (A and B) due to diversity in its surface glycoproteins
   2. Unlike influenza **RSV doesn't have an HA protein**
   3. Named RSV because its replication leads to fusion of neighboring cells into a **characteristic large multinucleated syncytium**
3. **FACTORS LEADING TO ENHANCED RESISTANCE OR SUSCEPTIBILITY**
   1. In the US, RSV infections occur as community outbreaks often lasting 4-6 month from November to April with peak activity in JANUARY or FEBRURARY
   2. Most Frequent aged group is INFANTS 2-6 months of age
   3. Most children recover in 8-15 days but those that are undergoing **chemotherapy** or have a **congenital heart disease** or **chronic lung disease** are at **risk for serious pneumonia and encephalopathy** (mortality—37%)
4. **DIFFERENTIAL DIAGNOSIS**
   1. Disease—Bronchiolitis
   2. Causes of Bronchiolitis
      1. Adenoviruses
      2. Human metapneumovirus
      3. Influenza viruses (types A, B, or C)
         1. Influenza virus has HA protein while RSV does not
      4. Metapneumovirus
      5. *Mycoplasma pneumoniae* 
         1. M. pneumoniae only infrequently causes symptomatic respiratory illness in patients this young.
      6. Parainfluenza viruses
      7. **Respiratory syncytial virus (RSV)** 
         1. In certain times of the year, RSV, among the viral pathogens that cause respiratory illness, is simply the most common etiology, especially among infants less than 6 months old.
      8. Rhinoviruses
   3. Tests to rule out causes
      1. **Antigen Detection**—by enzyme immunoassay or direct fluorescence Ab staining
      2. Virus culture of nasopharyngeal secretions
      3. PCR-based assay of nasopharyngeal secretions
5. **PREVENTION, TREATMENT, & VACCINE:**
   1. **PREVENTION**
      1. If you suspect RSV put patient under **contact isolation** due to the communicability of the virus
      2. **RSV-IGIV and humanized murine anti-RSV monoclonal antibody are available as prophylaxis** for some high risk infant and young children
      3. In large communicable areas (hospitals, etc) make sure there is **proper infection control measures** like attention to hand washing
   2. **TREATMENT**
      1. For children with **mild** disease—**no specific treatment** is necessary other than the **treatment of symptoms**
         1. Ex: acetaminophen to reduce fever
      2. For children with **severe** disease—they may require **oxygen therapy** and sometimes **mechanical ventilation**
      3. **Ribavirin** initially was reported to be effective and some investigators have use a combination of IgIV with high titers of neutralizing RSV Ab **(RSV-IGIV) and ribavirin** to treat patients with severe disease and compromised immune systems
   3. **VACCINE**
      1. Available on an experimental basis